

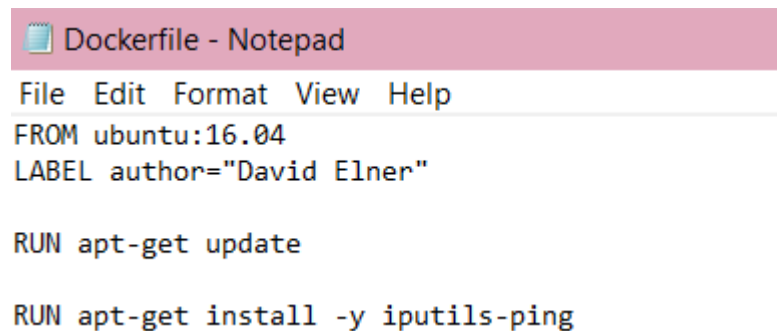
Exercise 3: Building images

1. Getting setup

```
PS C:\Users\whatanicedayiana> docker ps -a
CONTAINER ID   IMAGE      COMMAND                  CREATED         STATUS         PORTS          NAMES
80bef0548168   ubuntu:16.04  "/bin/bash"            26 minutes ago   Exited (0) 19 minutes ago           blissful_jemiso
PS C:\Users\whatanicedayiana> docker rm 80b
80b
PS C:\Users\whatanicedayiana> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
dcastillo/ping latest    1f4799bd595a   14 minutes ago 170MB
ubuntu        16.04    9ff95a467e45   3 weeks ago   135MB
PS C:\Users\whatanicedayiana> docker rmi 1f4
Untagged: dcastillo/ping:latest
Deleted: sha256:1f4799bd595ab300545562240988d48b297966a9c7f57b5050239c8d666f2f59
Deleted: sha256:290b26d4f07a8add7d6355bbe3c9a63317c5f734f78846d69dc040884e4a463b
PS C:\Users\whatanicedayiana> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        16.04    9ff95a467e45   3 weeks ago   135MB
```

Fig. 1. Removed existing containers and images

2. Creating a Dockerfile



```
Dockerfile - Notepad
File Edit Format View Help
FROM ubuntu:16.04
LABEL author="David Elner"

RUN apt-get update

RUN apt-get install -y iputils-ping
```

Fig. 2. Editing Dockerfile

3. Building the Dockerfile

```
PS C:\Users\whatanicedayiana\Documents\CoE197S\ME8_Containerization_and_Docker\3-building_images> docker build -t deiner/ping
[+] Building 18.1s (4/6)
=> [internal] load build definition from Dockerfile
.0s
=> => transferring dockerfile: 143B
.0s
=> [internal] load .dockerignore
.0s
[+] Building 82.8s (7/7) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 143B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/3] FROM docker.io/library/ubuntu:16.04
=> [2/3] RUN apt-get update
=> [3/3] RUN apt-get install -y iputils-ping
=> exporting to image
=> => exporting layers
=> => writing image sha256:8fc3d4ed6c3c59d38f6b90eeec668b4b5ff79d639cae8b6e794c6f6799c59df8
=> => naming to docker.io/deiner/ping
```

Fig. 3. Building and Tagging Image

```
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker build -t 'delner/ping'
[+] Building 0.1s (7/7) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 31B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/3] FROM docker.io/library/ubuntu:16.04
=> CACHED [2/3] RUN apt-get update
=> CACHED [3/3] RUN apt-get install -y iputils-ping
=> exporting to image
=> exporting layers
=> => writing image sha256:8fc3d4ed6c3c59d38f6b90eeec668b4b5ff79d639cae0b6e794c6f6799c59d78
=> => naming to docker.io/delner/ping
```

Fig. 4. Rerunning command results to a caching behavior

```
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
delner/ping         latest          8fc3d4ed6c3c   2 minutes ago  170MB
ubuntu              16.04          9ff95a467e45   3 weeks ago    135MB
```

Fig. 5. A new image is built

4. Optimizing the Dockerfile

```
Dockerfile - Notepad
File Edit Format View Help
FROM ubuntu:16.04
LABEL author="David Elner"

RUN apt-get update

RUN apt-get install -y iputils-ping

RUN apt-get clean \
    && cd /var/lib/apt/lists && rm -fr *Release* *Sources* *Packages* \
    && truncate -s 0 /var/log/*log
```

Fig. 6. Modifying Dockerfile to try to Optimize

```
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker build -t 'delner/ping' .
[+] Building 0.1s (8/8) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 32B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/4] FROM docker.io/library/ubuntu:16.04
=> CACHED [2/4] RUN apt-get update
=> CACHED [3/4] RUN apt-get install -y iputils-ping
=> CACHED [4/4] RUN apt-get clean && cd /var/lib/apt/lists && rm -fr *Release* *Sources* *Packages* && truncate -s 0 /v
=> exporting to image
=> => exporting layers
=> => writing image sha256:f3da05ab20189302f2a4dd705bd5cb0e7e3a59eb68499e96cdc13330bec3b0a9
=> => naming to docker.io/delner/ping

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
delner/ping latest f3da05ab2018 About a minute ago 170MB
ubuntu 16.04 9ff95a467e45 3 weeks ago 135MB
```

Fig. 7. Running build again with same result (nothing has been optimized –size is same)

```
Dockerfile - Notepad
File Edit Format View Help
FROM ubuntu:16.04
LABEL author="David Elner"

RUN apt-get update \
    && apt-get install -y iputils-ping \
    && apt-get clean \
    && cd /var/lib/apt/lists && rm -fr *Release* *Sources* *Packages* \
    && truncate -s 0 /var/log/*log
```

Fig. 8. Rewriting Dockerfile (to collapse all of the related RUN directives together)

```
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker build -t 'delner/ping' .
[+] Building 0.1s (6/6) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 32B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/2] FROM docker.io/library/ubuntu:16.04
=> CACHED [2/2] RUN apt-get update && apt-get install -y iputils-ping && apt-get clean && cd /var/lib/apt/lists &&
=> exporting to image
=> => exporting layers
=> => writing image sha256:7c8206326778ee09ffe45f4b87bb47822c9d2161f5ea21b74a9bb7963a0ec25e
=> => naming to docker.io/delner/ping

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
delner/ping latest 7c8206326778 29 seconds ago 139MB
ubuntu 16.04 9ff95a467e45 3 weeks ago 135MB
```

Fig. 9. Rebuilding the file outputs a more optimized image

5. Other Dockerfile directives

```
Dockerfile - Notepad
File Edit Format View Help
FROM ubuntu:16.04
LABEL author="David Elner"

ENV PING_TARGET "google.com"

RUN apt-get update \
    && apt-get install -y iputils-ping \
    && apt-get clean \
    && cd /var/lib/apt/lists && rm -fr *Release* *Sources* *Packages* \
    && truncate -s 0 /var/log/*log

CMD ["sh", "-c", "ping $PING_TARGET"]
```

Fig. 10. Modifying Dockerfile to include ENV and CMD directives

```
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker build -t 'delner/ping' .
[+] Building 0.1s (6/6) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 32B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/2] FROM docker.io/library/ubuntu:16.04
=> CACHED [2/2] RUN apt-get update && apt-get install -y iputils-ping && apt-get clean && cd /var/lib/apt/lists &&
=> exporting to image
=> => exporting layers
=> => writing image sha256:7c8206326778ee09ffe45f4b87bb47822c9d2161f5ea21b74a9bb7963a6ec25e
[+] Building 238.5s (6/6) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 356B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> CACHED [1/2] FROM docker.io/library/ubuntu:16.04
=> [2/2] RUN apt-get update && apt-get install -y iputils-ping && apt-get clean && cd /var/lib/apt/lists && rm -fr *
=> exporting to image
=> => exporting layers
=> => writing image sha256:e71e95fa2303ef8f111aa4833cad13b3276bc63500c614734d0c30c93f2649a6
=> => naming to docker.io/delner/ping

PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
delner/ping         latest          e71e95fa2303   4 minutes ago  139MB
ubuntu              16.04          9ff95a467e45   3 weeks ago    135MB

PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images> docker run -it delner/ping
PING google.com (172.217.163.238) 56(84) bytes of data.
64 bytes from 172.217.163.238: icmp_seq=1 ttl=37 time=40.9 ms
64 bytes from 172.217.163.238: icmp_seq=2 ttl=37 time=41.0 ms
64 bytes from 172.217.163.238: icmp_seq=3 ttl=37 time=43.0 ms
64 bytes from 172.217.163.238: icmp_seq=4 ttl=37 time=42.9 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 40.919/42.004/43.030/1.019 ms
PS C:\Users\whatanicedayiana\Documents\COE197S\ME8_Containerization_and_Docker\3-building_images>
```

Fig. 11. Rebuilding image and automatically running *ping* command